

What is claimed is:

1. A liquid crystal display panel comprising:
  - an array substrate;
  - a counter substrate opposing the array substrate;
  - 5 a liquid crystal layer sandwiched between the array substrate and the counter substrate;
  - a plurality of image signal lines provided over a surface of the array substrate that is in contact with the liquid crystal layer, the image signal lines being aligned in a same direction;
  - 10 a plurality of scanning signal lines provided over the surface of the array substrate over which the image signal lines are provided, the scanning signal lines being disposed perpendicular to the image signal lines;
  - 15 a line-shaped pixel electrode provided in each of pixel regions of the array substrate that is surrounded by the image signal lines and the scanning signal lines, the pixel electrode disposed parallel to the image signal lines or to the scanning signal lines;
  - a counter electrode provided in each of the pixel regions and disposed parallel to the pixel electrode;
  - 20 a switching element for electrically connecting the pixel electrode and one of the image signal lines in response to a signal received from the scanning signal lines;
- wherein, of the pixel electrode and the common electrode, the electrode that is disposed adjacent to and parallel to one of the image signal lines or one of the scanning signal lines is made of an opaque conductor, and at least

one of the other electrodes comprises a transparent conductor.

2. The liquid crystal display panel according to claim 1, further comprising an additional electrode made of a transparent conductor, the additional electrode being disposed over the array substrate so as to be parallel to, partially overlapping with, and electrically connected to the electrode that is disposed adjacent to one of the image signal lines or one of the scanning signal lines.

3. The liquid crystal display panel according to claim 2, wherein an electrode unit composed of a pair of the overlapping electrodes has a surface inclined toward an adjacent electrode.

4. The liquid crystal display panel according to claim 2, wherein a gap between an edge of the one of the pair of the overlapping electrodes that is made of a transparent conductor, and one of the signal lines that is perpendicular thereto is smaller than a gap between an edge of the other one of the electrodes that is opaque and the one of the signal lines.

5. The liquid crystal display panel according to claim 1, wherein the electrode that is disposed adjacent to and parallel to one of the image signal lines or one of the scanning signal lines is the line-shaped common electrode.

6. The liquid crystal display panel according to claim 1, wherein an electrode adjacent to the electrode that is disposed adjacent to and parallel

to one of the image signal lines and one of the scanning signal lines is made of a transparent conductor.

7. The liquid crystal display panel according to claim 1, further comprising an additional line-shaped electrode disposed on a surface of the counter substrate so as to oppose the one of the image signal lines or the one of the scanning signal lines with the liquid crystal layer interposed therebetween and to be parallel to the one of the image signal lines or the one of the scanning signal lines, the additional line-shaped electrode having a potential equal to that of an electrode adjacent to the one of the image signal lines or the one of the scanning signal lines.

8. The liquid crystal display panel according to claim 7, wherein the additional line-shaped electrode is made of a transparent conductor.

9. The liquid crystal display panel according to claim 7, wherein the additional line-shaped electrode covers a region opposing the adjacent electrode.

10. The liquid crystal display panel according to claim 1, further comprising a light shielding member covering a region between the electrode that is disposed adjacent to and parallel to one of the image signal lines or one of the scanning signal lines and the one of the image signal lines or the one of the scanning signal lines.

11. The liquid crystal display panel according to claim 10, wherein the

light shielding member is a black matrix disposed on the counter substrate.

12. The liquid crystal display panel according to claim 11, wherein the light shielding member is disposed on the array substrate.

13. The liquid crystal display panel according to claim 12, wherein the light shielding member is made of a conductive material.

14. The liquid crystal display panel according to claim 13, wherein the light shielding member is electrically insulated from surrounding members.

15. The liquid crystal display panel according to claim 13, wherein a gap is provided between the light shielding member and one of the image signal lines or one of the scanning signal lines that is perpendicular to the light shielding member.

16. The liquid crystal display panel according to claim 15, wherein the gap is larger than a gap between the adjacent electrode and one of the image signal lines or one of the scanning signal lines that is perpendicular to the adjacent electrode.

17. The liquid crystal display panel according to claim 12, wherein the light shielding member is disposed in a layer lower than that of the electrode that is disposed adjacent to and parallel to one of the image signal lines or one of the scanning signal lines on the array substrate.

18. The liquid crystal display panel according to claim 10, wherein the

light shielding member covers a region between a pair of the electrodes that are adjacent to each other with one of the image signal lines or one of the scanning signal lines disposed therebetween.

5        19. The liquid crystal display panel according to claim 1, wherein the electrode that is disposed adjacent to and parallel to one of the image signal lines or one of the scanning signal lines is the common electrode.

20. The liquid crystal display panel according to claim 1, wherein the common electrodes are disposed over each of the array substrate and the counter substrate.

10      21. The liquid crystal display panel according to claim 1, wherein in the centerline of the surface of the electrode that is disposed adjacent to and parallel to one of the image signal lines or one of the scanning signal lines, an electric flux line of an electric field formed between the electrode and an electrode adjacent thereto is inclined toward the adjacent electrode with respect to the direction of the normal of the array substrate.

15      22. The liquid crystal display panel according to claim 21, wherein the upper surface of the electrode that is disposed adjacent to and parallel to one of the image signal lines or one of the scanning signal lines is inclined toward the adjacent electrode.

20      23. A liquid crystal display panel comprising:  
an array substrate;

a counter substrate opposing the array substrate;

a liquid crystal layer sandwiched between the array substrate and the counter substrate;

5 a plurality of image signal lines provided over a surface of the array substrate that is in contact with the liquid crystal layer, the image signal lines being aligned in a same direction;

10 a plurality of scanning signal lines provided over the surface of the array substrate over which the image signal lines are provided, the scanning signal lines being disposed perpendicular to the image signal lines;

15 a line-shaped pixel electrode provided in each of pixel regions of the array substrate that is surrounded by the image signal lines and the scanning signal lines, the pixel electrode disposed parallel to the image signal lines or to the scanning signal lines;

20 a counter electrode provided in each of the pixel regions and disposed parallel to the pixel electrode; and

a switching element for electrically connecting the pixel electrode and one of the image signal lines in response to a signal received from the scanning signal lines;

wherein, in the centerline of the surface of the electrode that is disposed adjacent to and parallel to one of the image signal lines or one of the scanning signal lines, an electric flux line of an electric field formed between the electrode and an electrode adjacent thereto is inclined toward the adjacent electrode with respect to the direction of the normal of the array substrate.

24. The liquid crystal display panel according to claim 23, wherein the upper surface of the electrode that is disposed adjacent to and parallel to one of the image signal lines or one of the scanning signal lines is inclined toward the adjacent electrode.

5        25. The liquid crystal display panel according to claim 24, wherein the electrode that is disposed adjacent to and parallel to one of the image signal lines or one of the scanning signal lines comprises a pair of electrode members that are disposed parallel to each other and electrically connected to each other, portions of the electrode members overlapping with each other, 10 and the inclined upper surface includes an upper surface of the electrode member that is disposed in an upper layer.

15        26. The liquid crystal display panel according to claim 24, wherein the pair of electrode members are disposed so as to sandwich an insulating film, and a thickness of the insulating film decreases from a side of the one of the image signal line or the one of the scanning signal lines toward a side of the adjacent electrode.

20        27. The liquid crystal display panel according to claim 23, wherein the electrode that is disposed adjacent to and parallel to one of the image signal lines or one of the scanning signal lines has a step-shaped upper surface such that a thickness thereof decreases in a stepwise manner toward the adjacent electrode.

28. The liquid crystal display panel according to claim 1, wherein all

the common electrodes are disposed over the array substrate.

29. A liquid crystal display panel comprising:

an array substrate;

a counter substrate opposing the array substrate;

5 a liquid crystal layer sandwiched between the array substrate and the counter substrate;

a plurality of image signal lines provided over a surface of the array substrate that is in contact with the liquid crystal layer, the image signal lines being aligned in a same direction;

10 a plurality of scanning signal lines provided over the surface of the array substrate over which the image signal lines are provided, the scanning signal lines being disposed perpendicular to the image signal lines;

15 a line-shaped pixel electrode provided in each of pixel regions of the array substrate that is surrounded by the image signal lines and the scanning signal lines, the pixel electrode disposed parallel to the image signal lines or to the scanning signal lines;

20 a counter electrode provided in each of the pixel regions and disposed parallel to the pixel electrode;

a switching element for electrically connecting the pixel electrode and one of the image signal lines in response to a signal received from the scanning signal lines; and

25 a light shielding member covering a region between the electrode that is disposed adjacent to and parallel to one of the image signal lines or one of the scanning signal lines and the one of the image signal lines or the one of

the scanning signal lines.

30. The liquid crystal display panel according to claim 29, wherein the light shielding member is a black matrix disposed on the counter substrate.

31. The liquid crystal display panel according to claim 29, wherein the 5 light shielding member is disposed on the array substrate.

32. The liquid crystal display panel according to claim 31, wherein the light shielding member is made of a conductive material.

33. The liquid crystal display panel according to claim 32, wherein the light shielding member is electrically insulated from surrounding members.

10 34. The liquid crystal display panel according to claim 32, wherein a gap is provided between the light shielding member and one of the image signal lines or one of the scanning signal lines that is perpendicular to the light shielding member.

15 35. The liquid crystal display panel according to claim 32, wherein the gap is larger than a gap between the adjacent electrode and one of the image signal lines or one of the scanning signal lines that is perpendicular to the adjacent electrode.

20 36. The liquid crystal display panel according to claim 29, wherein the light shielding member is disposed in a layer lower than that of the electrode that is disposed adjacent to and parallel to one of the image signal

lines or one of the scanning signal lines on the array substrate.

37. The liquid crystal display panel according to claim 30, wherein the light shielding member covers a region between a pair of the electrodes that are adjacent to each other with one of the image signal lines or one of the scanning signal lines disposed therebetween.

38. A liquid crystal display panel comprising:

an array substrate;

a counter substrate opposing the array substrate;

10 a liquid crystal layer sandwiched between the array substrate and the counter substrate;

a plurality of image signal lines provided over a surface of the array substrate that is in contact with the liquid crystal layer, the image signal lines being aligned in a same direction;

15 a plurality of scanning signal lines provided over the surface of the array substrate over which the image signal lines are provided, the scanning signal lines being disposed perpendicular to the image signal lines;

20 a line-shaped pixel electrode provided in each of pixel regions of the array substrate that is surrounded by the image signal lines and the scanning signal lines, the pixel electrode disposed parallel to the image signal lines or to the scanning signal lines;

a counter electrode provided in each of the pixel regions and disposed parallel to the pixel electrode;

a switching element for electrically connecting the pixel electrode and

one of the image signal lines in response to a signal received from the scanning signal lines; and

a black matrix disposed in a region of the counter substrate that opposes the image signal lines or the scanning signal lines, the black matrix covering an area extending from the edge of the electrode adjacent to one of the scanning signal lines or one of the image signal lines for a distance  $d \cdot \tan \theta_t$ , where  $d$  is a thickness of the liquid crystal layer and  $\theta_t$  is the angle between the direction of the normal of the surface of the array substrate and the propagating direction of a light that has transmitted through the liquid crystal layer when the light undergoes total reflection at a boundary surface between the device and an outside.

39. The liquid crystal display panel according to claim 38, wherein the black matrix covers a region of the liquid crystal layer in which liquid crystal molecules contained therein are driven by an electric field formed between one of the image signal lines or one of the scanning signal lines and the electrode disposed adjacent to and parallel to the one of the image signal lines or the one of the scanning signal lines.